

## **REMARKS**

Claims 1, 3-19, 22-27, and 30 are now pending in the application. Claims 1, 3-19, 22-27, and 30 stand rejected. Claims 2, 20, 21, 28, and 29 have been previously cancelled. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the remarks contained herein.

## **REJECTION UNDER 35 U.S.C. § 103**

Claims 1, 3-4, 8-11, 13, 18-19 and 23-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley et al. (U.S. Pat. No. 5,161,604, hereinafter "Chandley") in view of Setzer et al. (U.S. Pat. No. 5,230,754, hereinafter "Setzer"). These rejections are respectfully traversed.

Initially, with regard to Chandley, Applicants note that Chandley discloses using a vacuum to pull molten iron into a mold, wherein the mold includes an alloyant stuccoed to a wall of the mold. Chandley does not teach, suggest or disclose whatsoever casting aluminum or casting aluminum with a metallurgical modifier. Setzer discloses a method of mixing aluminum with an alloyant. Setzer discloses creating a bath of molten pure aluminum, adding a specified amount of boron, mixing the aluminum and boron, adding a specified amount of silicon or strontium into the aluminum-boron mixture and mixing the resultant to form an aluminum-boron-strontium or aluminum-boron-silicon (or aluminum-boron-strontium-silicon) master alloy. Thus, Setzer teaches forming aluminum alloys through mixing alloyant(s) in a bath of molten aluminum until the desired amount of alloyant is present in the resulting molten mixture. In contrast,

Applicants note independent Claim 1 recites:

at least one chamber located **within the runner system and containing a metallurgical modifier selected for combination with molten aluminum**, the metallurgical modifier selected from the group of antimony, beryllium, boron, calcium, fluxing salts, phosphorous, silver, sodium, strontium, titanium, titanium boron, vanadium and zirconium, or a combination thereof. (emphasis added)

In addition, independent Claim 18 recites:

means for adjusting the chemistry of molten aluminum **after the molten aluminum is introduced into the casting mold** during a casting process. (emphasis added)

Independent Claim 19 recites:

**introducing molten aluminum into the casting mold;**  
forming a **silicon-aluminum metal melt cast**; and  
providing a metallurgical modifier comprising strontium in the form of stock material. (emphasis added)

In view of the above discussion, Applicants respectfully submit that neither Chandley nor Setzer teach or suggest Applicants' claims herein. Furthermore, the Office's combination of Chandley with Setzer is improper.

First, there is no suggestion in Chandley whatsoever regarding the desirability of modifying Chandley for use in casting aluminum with a metallurgical modifier. The Office argues that the claims of Chandley are broad to encompass all types of materials; however, Chandley does not teach, suggest or disclose whatsoever casting aluminum or casting aluminum with a metallurgical modifier. Applicants submit it is improper for the Office to combine Chandley with Setzer to without any express suggestion of the desirability to do so. In particular:

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention,

absent some teaching or suggestion supporting the combination. Under section 103, **teachings of references can be combined only if there is some suggestion or incentive to do so.**

ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984) (emphasis added). Accordingly, as Chandley does not teach or suggest whatsoever casting aluminum through his forming technique, Applicants respectfully assert the Office's combination of Chandley with Setzer is improper.

Second, Applicants respectfully submit it is improper to modify Chandley with Setzer as Setzer teaches away from this modification. Specifically:

It is established that where references, instead of suggesting the invention, **seek or warn to avoid the suggestion**, such references diverge from and teach away from the invention at hand and it is error to find obviousness based on such references.

In re Fine, 837 F.2d 1071, 1074, 5USPQ2d 1596, 1599 (Fed. Cir. 1988) (emphasis added). In this regard, Setzer teaches forming an aluminum-boron-strontium alloy by mixing the strontium thoroughly in a molten bath of pure aluminum. Setzer teaches that this process is necessary to ensure a uniform amount strontium throughout the molten aluminum. Only **after** the molten aluminum and alloyant is thoroughly mixed in the bath does Setzer indicate casting the resulting alloy, as the mixing process ensures that the alloyant (strontium) is present throughout the molten aluminum in the desired quantities (necessary for creating the grain refinement in the resulting aluminum alloy). Thus, Setzer teaches away from or warns against introducing the molten aluminum into the casting mold **before** the molten aluminum is introduced to the alloyant, in direct contrast to Chandley. Thus, as Setzer teaches away from modifying the metallurgical properties of molten aluminum in the casting mold. In view of this, Applicants submit that one

skilled in the art would not be motivated to combine the Chandley reference with the Setzer reference.

Applicants further note that it is clear, due to the different chemical properties of aluminum and iron, if aluminum was used in the casting process of Chandley it would likely create undesirable components which would have chemical properties distinctly different than that originally contemplated by Chandley. In particular, Chandley discloses the use of a magnesium based alloyant (Column 5, lines 4-7) to nodularize or spherodize the carbon in the melt (see at least Column 5, lines 5-12). Thus, modifying Chandley to include aluminum casting would render the method of Chandley unsatisfactory for its intended purpose and is improper, as nodularized or spherodized carbon are structures formed in iron/carbon alloys, not aluminum alloys.

Specifically, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900,221 USPQ 1125 (Fed. Cir. 1984) MPEP 2143.01. Additionally, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (C.C.P.A. 1959) MPEP 2143.01. As employing the techniques of Chandley to cast aluminum would render the method of operation of Chandley unsatisfactory (i.e., magnesium would not nodularize the carbon in aluminum, as aluminum is not carbon based), the Examiner's modification of Chandley with Setzer is improper.

Further, Applicants submit the Office is improper in asserting that one of ordinary

skill, based on the claims in the Chandley reference, would find it obvious to modify Chandley with Setzer to arrive at Applicants' claims herein. In particular, Applicants note that although one skilled in the art might find it obvious to try various combinations of prior art components, **this is not the standard of 35 U.S.C. § 103.** (*In re Geiger*, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). Rather, in order to find Applicants' claims obvious, the Office must produce both the suggestion and expectation of success in making such a combination. As Chandley does not teach, suggest or disclose any desirability in using his process to cast pure aluminum, and further, as Setzer teaches away from the process employed by Chandley, Applicants respectfully assert the Office's combination of Chandley with Setzer is improper.

Accordingly, in view of the above discussion, Applicants respectfully assert the Examiner has not presented a *prima facie* case of obviousness and as such, Applicants respectfully request the Office to reconsider and withdraw the rejection of Claim 1, 18 and 19 under 35 U.S.C. § 103(a).

Claims 5-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of Setzer et al. and further in view of either Trager et al. (U.S. Pat. No. 4,867,227, hereinafter "Trager") or Craig et al. (U.S. Pat. No. 6,793,707). Claims 12, 17, 26 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of Setzer and further in view of Fischer (U.S. Pat. No. 5,033,531, hereinafter "Fischer"). Claims 14-16 and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandley in view of Setzer and further in view of Daussan et al. (U.S. Pat. No. 6,540,005, hereinafter "Daussan"). These rejections are respectfully traversed.

With regard to Claims 5-7, 12, 14-17, 26, 27 and 30, Applicants note these claims depend directly or indirectly from either independent Claim 1 or 19, and, thus, should be in condition for allowance for the reasons set forth for Claims 1 and 19 above. Accordingly, Applicants respectfully requests the Office reconsider and withdraw the rejections of Claims 5-7, 12, 14-17, 26, 27 and 30 under 35 U.S.C. § 103(a).

**CONCLUSION**

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By:   
Christopher A. Eusebi, Reg. No. 44,672  
Erica K. Schaefer, Reg. No. 55,861

CORRESPONDENCE ADDRESS:

Kathryn A. Marra  
General Motors Corporation  
Legal Staff - Mail Code 482-C23-B21  
PO Box 300 - 300 Renaissance Center  
Detroit, Michigan 48265-3000  
Ph: 313-665-4708  
Fax: 313-665-4976

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